Executive Order G-70-204-A
Gilbarco VaporVac/OPW Vaporsaver
ORVR-Compatible Phase II Vapor Recovery System

Exhibit 2
System Specifications

Figures 2A-1 through 2A-10 contain drawings of a typical installation of the VaporVac/Vaporsaver system. Figure 2B-1 depicts the location of component parts of the VaporVac system. Figure 2C-1 includes an illustration and instructions for conducting A/L testing with the Husky 6250 nozzle. Figures 2D-1 through 2D-3 contain drawings of typical manifold installation of one, two and three P/V Vent Valve configurations. Figure 2E-1 contains an example of a GDF Maintenance Record.

Vaporsaver[1]

The Vaporsaver tank pressure management system processes vapor to reduce pressure in the underground storage tank. Detection of a positive pressure of +0.10 ± 0.04 inches water column (" wc), causes the processor to actuate. A maximum of ten minutes of run time is alternated with a minimum of a two-minute rest period during a typical run cycle. The processor stops running when a negative pressure of -0.50 ± 0.20" wc is reached or when the ten minute cycle ends.

1. The processor automatically runs diagnostics each time the high pressure set point (0.10 ± 0.04) is triggered to verify proper pressure and vacuum levels or detect various potential equipment failures, listed below in sections A, B, C and D. In the event of a failure, an audible and visual alarm sounds and an error message is displayed on the User Interface indicating the detected condition and the error is posted to the alarm history. Pressure-related fugitive emissions, including vent emissions, significantly impair the effectiveness of the vapor recovery system when the processor is not operative for more than 24 consecutive hours (including time when the GDF is closed for business). A processor that is inoperative for more than 24 consecutive hours is considered a vapor recovery equipment defect and the system shall be removed from service. The Control Panel displays SYSTEM NORMAL during normal operation. **Failure conditions are indicated by the following error codes**, which are also displayed on the Control Panel.

    A. ALARM COMP (Compressor/Feed Pump Alarm)
    The Control System Feed Pump (Compressor) has not achieved minimum operating pressure (15 psi) within the required time (30 seconds of the motor

[1] Executive Order G-70-204 requires that the system be removed from service when the Vaporsaver is inoperative. This requirement is hereby repealed for any system subject to Executive Order G-70-204. The requirement for removal from service is as stated in this Exhibit for any system subject to Executive Order G-70-204.

starting). The system shall be removed from service if the processor is inoperative for more than 24 consecutive hours.

B. ALARM VAC (Vacuum Pump Alarm)
The Control System Vacuum Pump has not achieved minimum operating vacuum (15 in Hg) within the required time (30 seconds of the motor starting). The system shall be removed from service if the processor is inoperative for more than 24 consecutive hours.

C. ALARM PR (General Processor Alarm)
This is a general alarm that could be caused by one or more of the errors listed below. The system shall be removed from service if the processor is inoperative for more than 24 consecutive hours.

The motor relay has failed in the closed position, leaving the Control System cycling continuously when it is not required.

Compressor pressure switch has failed in the closed position.

Vacuum pump pressure switch has failed in the closed position.

D. ALARM HC (Hydrocarbon Sensor Alarm)
This alarm indicates that the hydrocarbon concentration of the exhaust air exceeds the 4% by volume limit. The system shall be removed from service if the processor is inoperative for more than 24 consecutive hours.

The hydrocarbon concentration in the exhaust air may be determined by ARB Method 100, ***Procedures for Continuous Gaseous Emission Stack Sampling***. This determination is not required by OPW or ARB, but may be used to verify that sensor alarm is operating properly.

2. The following error message indicates a warning condition for the processor that should be investigated by a trained service technician. The station operator is required to call for service within 24 hours of the posted error code warning. This does not indicate that the processor is inoperative and should be removed from service.

A. WARNING RT (Run Time Warning)
This warning indicates that the Control System daily run time is either too long or not long enough. This alarm is displayed when one of the following conditions exists:

Excessive Run Time. This displays when the processor run time is greater than 1140 minutes per day for three consecutive days.

Minimal Run Time. This is displayed when the system runs for no more than five minutes per day for three consecutive days.

3. In addition to the automatic diagnostic tests, the processor has a RESET procedure that manually forces a Self Test for up to 180 seconds. The procedure is as follows:

   On the Control Panel, press MENU button
   Press the RESET button
   Press the YES button to confirm RESET

   During the Self Test, the Control System will run and verify proper operation of all the components. If there is a problem, the Control System will shut down, the User Interface will sound an alarm and display the alarm condition. Note that if more than one alarm occurs at the same time, the most recent will appear first, then the previous one, until all the current alarms are shown.

4. VaporVac/Vaporsaver installations shall not exceed a maximum of 16 fueling points.

5. The processor shall activate when the pressure of the underground storage tank exceeds 0.14 inches WC as determined by Exhibit 4, ***Determination of Pressure of Underground Gasoline Storage Tanks.*** Districts shall specify the frequency of testing.

6. A processor that is inoperative for more than 24 consecutive hours is considered a vapor recovery equipment defect which substantially impairs the effectiveness of the vapor recovery system.

7. Except for testing, repairs or maintenance activities, the processor shall be operating at all times.

8. Maintenance requirements for the Vaporsaver system are provided in the Vaporsaver Start-up and Troubleshooting manual and are summarized in the table below:

Maintenance Interval	Maintenance
12 months	Visually check system for leaks, inspect belts, and verify operating pressure and vacuum readings. Verify total run time and replace pumps if greater than recommended maximum hours
36 months	Replace hydrocarbon sensor

Nozzles

1. The VaporVac/Vaporsaver system has one vapor pump per fueling point (dispenser side). Different brands of nozzles may be used on the same fueling point.

2. The nozzles shall have an integral vapor valve which prevents the loss of vapor from the underground storage tanks, ensures proper operation of the system and prevents the ingestion of air into the system when another nozzle which is connected to the same vapor pump is used. Any nozzle with a defective vapor valve will substantially impair the effectiveness of the other nozzles associated with the same vapor pump. Therefore, any nozzle with a defective vapor valve, and all nozzles at the same fueling point (dispenser side), shall be immediately removed from service and the vapor path shall be closed as soon as practicable.

3. Nozzles shall be performance checked at the factory, including checks of the integrity of the vapor path. The maximum allowable leak rate for the nozzle, as determined by TP-201.2B, Flow and Pressure Measurement of Vapor Recovery Equipment, shall not exceed the following:

   0.038 CFH at a pressure of two inches water column (2" w.c.), and
   0.005 CFH at a vacuum of twenty-seven inches water column (approx. 1 psi).

4. Failure mode testing demonstrated that blockage of some of the vapor collection holes in the spout of the nozzle has negligible effect on the operation of the system until the number of unblocked holes is less than required below. Any nozzle that is found to have fewer than the required number of unobstructed vapor collection holes is defective and shall be immediately removed from service.

Nozzle	Minimum Number of Unblocked Vapor Holes Required
Catlow ICVN (Richards AstroVac)	3
Emco Wheaton A4505	3
Husky V34 6250	N/A*****
OPW 12VW	1

* The Husky V34 6250 nozzle uses a solid spout design and does not have any vapor collection holes on the tip of the spout. Gasoline vapors are directed to the base of the spout by the VSG to be collected by the VaporVac/Vaporsaver System.

5. **Catlow ICVN Nozzle (Richards AstroVac).** An Efficiency Compliance Device (ECD) shall be installed on the Catlow ICVN (Richards AstroVac) nozzle at the base of the spout, as shown in **Figure 1A-1**. Any Catlow ICVN (Richards AstroVac) nozzle with an ECD which is missing, or which is damaged with a slit from the base to the rim is defective and shall be immediately removed from service.

6. **Emco Wheaton A4505 Nozzle.** A Vapor Guard (VG) shall be installed on the Emco Wheaton A4505 nozzle at the base of the spout, as shown in **Figure 1A-2**.

Any Emco Wheaton A4505 nozzle with a VG which is missing, or which is damaged such that at least one-eighth (1/8) of the circumference is missing, or which has cumulative damage equivalent to at least 1/8 of the circumference missing, is defective and shall be immediately removed from service.

7. **Husky V34 6250 Nozzle.** A Vapor Splash Guard (VSG) shall be installed on the Husky V34 6250 nozzle at the base of the spout, as shown in **Figure 1A-3**. Any Husky V34 6250 nozzle with a VSG which is missing, or which is damaged such that at least a one and one-half (1.5) inch slit has developed, or which has cumulative damage equivalent to at least a 1.5 inch slit, is defective and shall be immediately removed from service. Any Husky V34 6250 nozzle with a VSG which is damaged such that greater than a three-eighths (3/8) inch hole has developed, or which has cumulative damage greater than a 3/8 inch hole, is defective and shall be immediately removed from service.

8. **OPW 12VW Nozzle.** A Vapor Escape Guard (VEG) shall be installed on the OPW 12VW nozzle at the base of the spout, as shown in **Figure 1A-4**. Any OPW 12VW nozzle with a VEG which is missing, or which is damaged such that at least three-quarters (3/4) of the circumference is missing, or which has cumulative damage equivalent to at least 3/4 of the circumference missing, is defective and shall be immediately removed from service.

Solenoid Vapor Valves

1. The VaporVac system was originally certified with solenoid vapor valves. These valves are no longer required but, if present, may remain in place.

Air To Liquid Ratio

1. The A/L ratio of the system, measured at a flow rate between six and ten gallons per minute (6.0 – 10.0 gpm), shall be **0.90** to **1.10**. Any fueling point not capable of demonstrating compliance with this performance standard shall be deemed defective and removed from service. The A/L ratio shall be determined by using Exhibit 5, with the shut-off port excluded. Alternative test procedures may be used if they are determined by the Executive Officer, in writing, to yield comparable results. **Figure 2C-1** includes an illustration and instructions for conducting A/L testing with the Husky V34 6250 nozzle.

Inverted Coaxial Hoses

1. The length of hose which may be in contact with the island and/or ground when the nozzle is properly mounted on the dispenser is limited to six inches (6").

2. The maximum length of the hose shall be fifteen feet (15').

VaporVac System

1. The VaporVac shall be equipped with electronic safeguards designed to ensure that no fuel is dispensed unless the VaporVac system is operating properly. An error code is indicated on the sales display of the dispenser, which identifies the problem as being related to the VaporVac system.

2. The following conditions shall halt or inhibit the operation of the one side of the dispenser, with an error code indicated, while allowing the other side to operate.

   Excessive vapor pump motor current; possible causes include bearing failure, locked rotor, motor winding shorts or fluid in pump cavity for more time than required to clear a blockage.

   Failure of the vapor pump to start while fuel is being dispensed (possible causes include control electronics failure, disconnected or severed motor wiring, or locked rotor).

   Vapor pump activity during idle periods when no fuel is being dispensed.

   Maximum permissible pump speed exceeded (possible causes include loose connections in vapor path or pump malfunction).

   Disconnection or accidental swapping of Side A/B vapor pumps. The VaporVac control system is designed to verify that side A is connected to pump A and side B is connected to pump B. This is done by a crossover check that the system conducts when either side of the dispenser is activated. If the sides are crossed, an error code will be triggered for both sides of the dispenser.

   The following conditions shall shut down the entire dispenser in a manner similar to a "dead-man switch", in that the VaporVac system must actively prevent its activation. This is achieved by requiring the VaporVac system to maintain a normally-closed switch, which will open should the VaporVac system be taken "off-line" via various mechanisms.

   A. Failure or loss of the VaporVac power supply.

   B. A.C. line fuse opens.

   C. Cabling/wiring missing or disconnected (tampering).

Pressure/Vacuum Vent Valves for Storage Tank Vents

1. The P/V vent valve shall be an ARB-certified valve as specified in Exhibit 1.

2. At least one pressure/vacuum (P/V) vent valve shall be installed on each tank vent. Vent lines may be manifold to minimize the number of P/V vent valves and potential leak sources, provided the manifold conforms to all applicable fire regulations. At least one P/V vent valve shall be installed on manifold vents. Figure 2D-1 shows a typical manifold configuration for a single P/V vent valve. If two P/V vent valves are desired, they shall be installed in parallel, so that each can serve as a backup to the other if one should fail to open properly. Figure 2D-2 shows a typical manifold configuration for two P/V vent valves installed in parallel. Figure 2D-3 shows a typical manifold configuration for three P/V vent valves installed in parallel.

Vapor Recovery Piping Configurations

1. The recommended maximum pressure drop through the system, measured at a flow rate of 60 SCFH with dry Nitrogen gas, is 0.02 inches water column (0.03 inches wc at 60 SCFH if the measurement includes an impact valve). The maximum allowable pressure drop through the system shall never exceed one/half inch (0.5") water column at 60 SCFH. The pressure drop shall be measured from the dispenser riser to the UST with the P/V vent valves installed and with the poppeted Phase I vapor connection open, as specified in TP-201.4 (July 3, 2002).

   Note: The A/L test may be used to verify proper operation of the system, in lieu of measuring the pressure drop through the lines, provided that at least two gallons of product are introduced into the system through each dispenser riser.

2. All vapor return lines shall slope a minimum of 1/8 inch per foot. A slope of 1/4 inch or more per foot is recommended wherever feasible.

3. The dispenser shall be connected to the riser with either flexible or rigid materials specified by the manufacturer as acceptable for use with gasoline. The dispenser-to-riser connection shall be installed so that any liquid in the lines will drain toward the storage tank. The internal diameter of the connector, including all fittings, shall not be less than three-fourths inch (3/4").

4. All vapor return and vent piping shall be installed in accordance with the manufacturer's instructions and all applicable regulations.

5. No product shall be dispensed from any fueling point associated with a vapor line that is disconnected and open to the atmosphere. If vapor lines are manifold, this includes all fueling points in the facility.

6. The recommended nominal inside diameter of the underground Phase II plumbing is as indicated in **Figures 2A-1** through **Figures 2A-10**. Smaller vapor lines are not recommended but may be used provided the pressure drop criteria specified above are met. The vapor return lines shall be manifold below grade at the tanks as indicated in the figures.

   Exception: For installations with a vapor return line directly to only one tank, and for which a manifold on the tank vents will be used to provide part of the vapor return path to other tanks, the vent manifold may be used as an alternative to the underground manifold only in existing installations where the vapor piping is already installed, and shall not be used in "new" installations where vapor piping is being installed. For installations with dedicated vapor piping directly to each tank, the vent manifold is approved for both new and existing installations and an additional tank manifold below grade is optional but not required.

Phase I System

1. The Phase I system shall be an ARB-certified system which is in good working order and which demonstrates compliance with the static pressure decay test criteria contained in TP-201.3 (March 17, 1999).

Maintenance Records

1. Each GDF operator/owner shall keep records of maintenance performed at the facility. Such records shall be maintained on site in accordance with district requirements or policies. The records shall include the maintenance or test date, date and time of maintenance call, repair date to correct test failure, maintenance or test performed, affiliation, telephone number and name of individual conducting maintenance or test. An example of a Maintenance Record is shown in Figure 2E.

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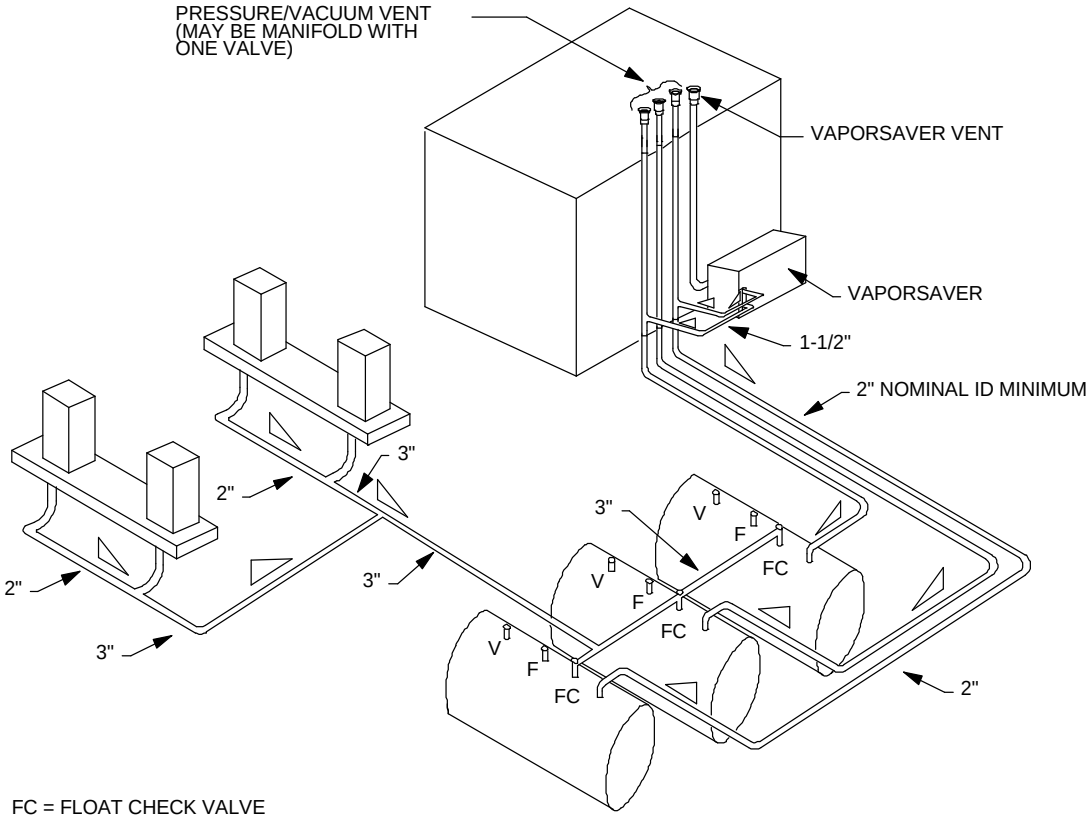
Gilbarco VaporVac/OPW Vaporsaver
ORVR-Compatible Phase II Vapor Recovery System

Exhibit 2
Figure 2A-1
Typical Installation of the OPW Vaporsaver
Phase II Tank Pressure Management System
with Typical Phase II Vapor Recovery System



FC = FLOAT CHECK VALVE
F = FILL LINE
V = PHASE I VAPOR RECOVERY

NOTE:
1. ALL VAPOR/VENT LINES ARE 3" NOMINAL ID MINIMUM EXCEPT AS NOTED
2. SLOPE: 1/8" PER FOOT MINIMUM
1/4" PER FOOT PREFERED

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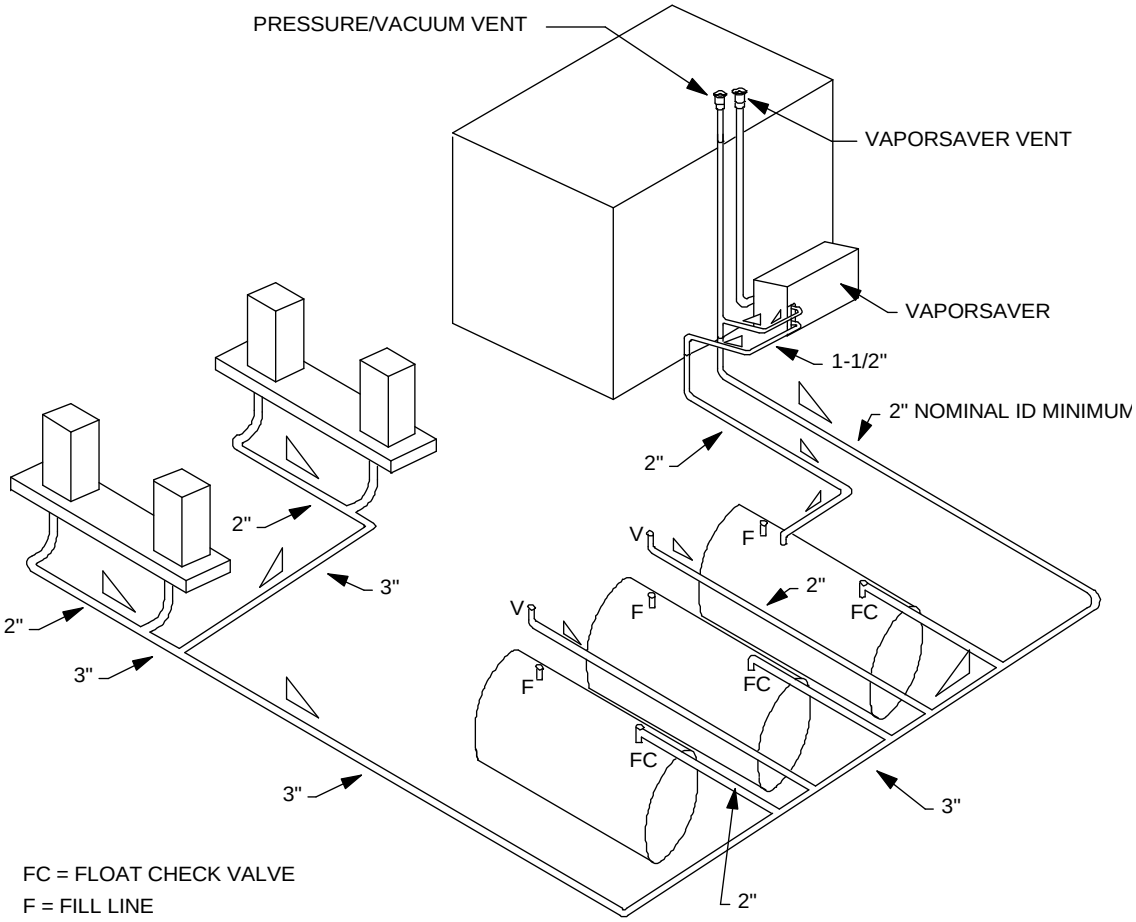
Gilbarco VaporVac/OPW Vaporsaver
ORVR-Compatible Phase II Vapor Recovery System

Exhibit 2
Figure 2A-2
Typical Installation of the OPW Vaporsaver
Phase II Tank Pressure Management System
with Typical Phase II Vapor Recovery System



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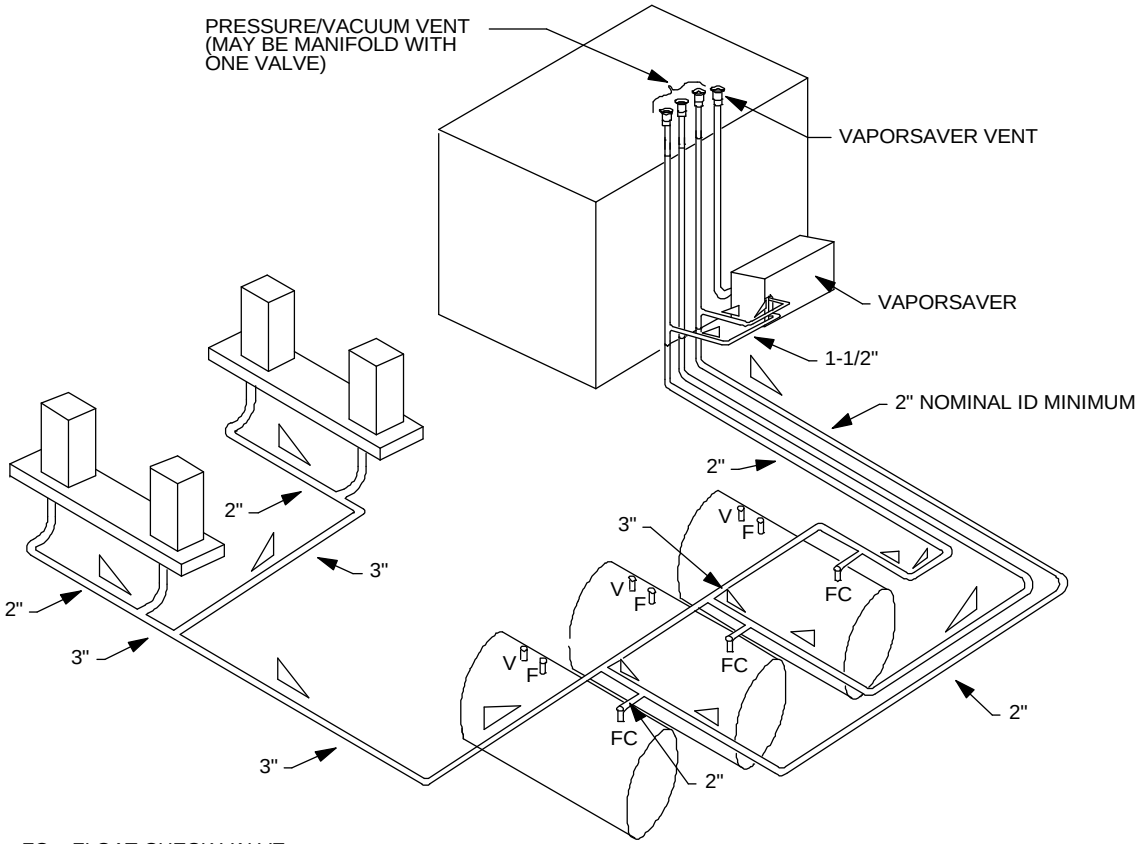
ORVR-Compatible Phase II Vapor Recovery System

Exhibit 2
Figure 2A- 3
Typical Installation of the OPW Vaporsaver
Phase II Tank Pressure Management System
with Typical Phase II Vapor Recovery System



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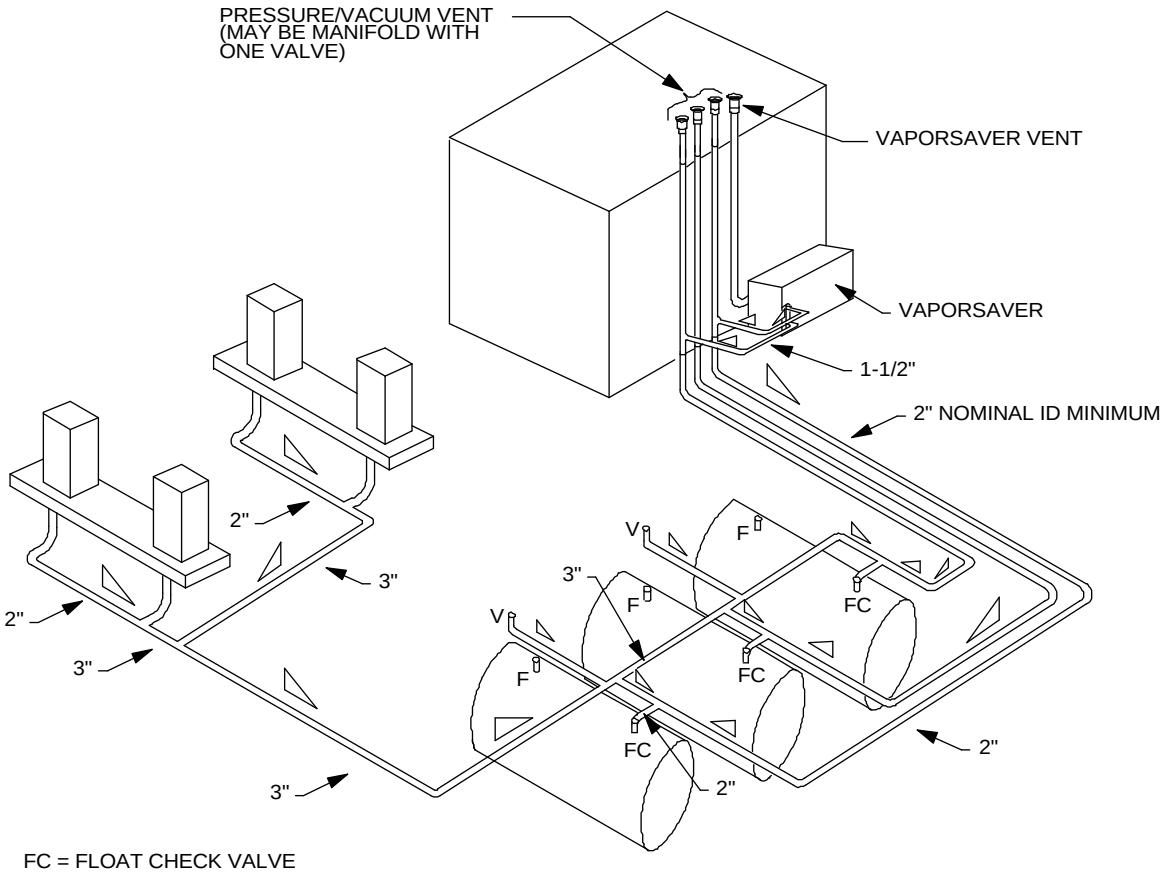
ORVR-Compatible Phase II Vapor Recovery System

Exhibit 2
Figure 2A- 4
Typical Installation of the OPW Vaporsaver
Phase II Tank Pressure Management System
with Typical Phase II Vapor Recovery System



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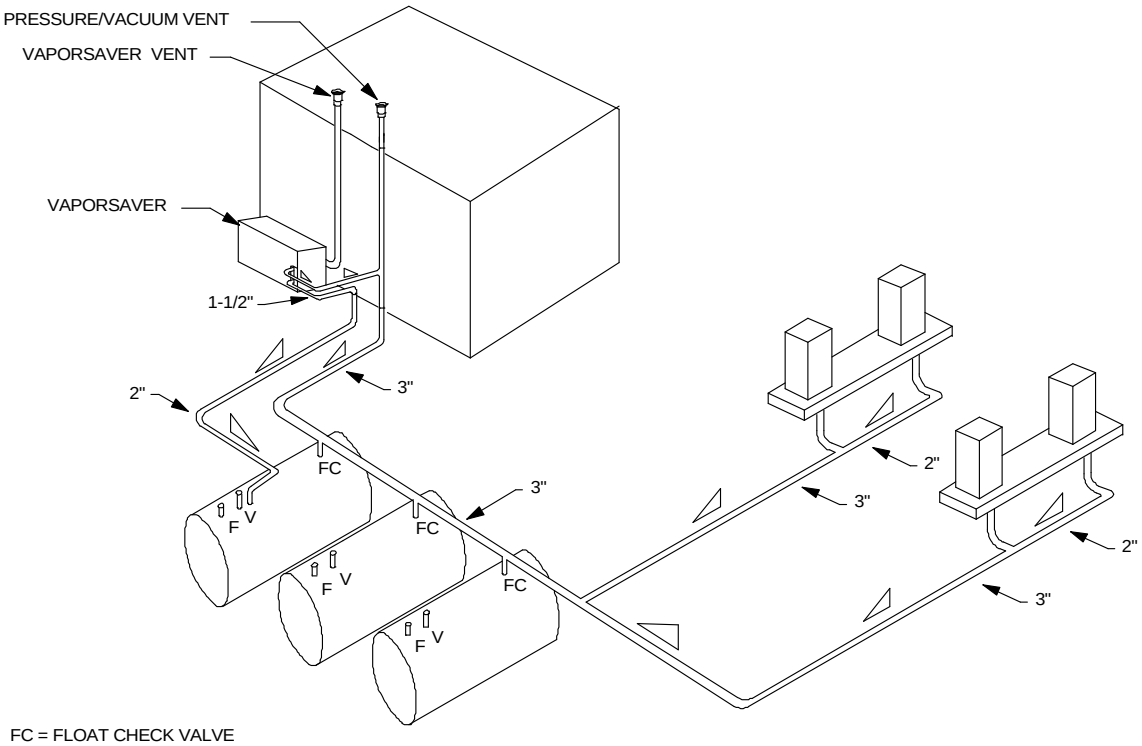
ORVR-Compatible Phase II Vapor Recovery System

Exhibit 2
Figure 2A- 5
Typical Installation of the OPW Vaporsaver
Phase II Tank Pressure Management System
with Typical Phase II Vapor Recovery System



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F = FILL LINE
V = PHASE I VAPOR RECOVERY

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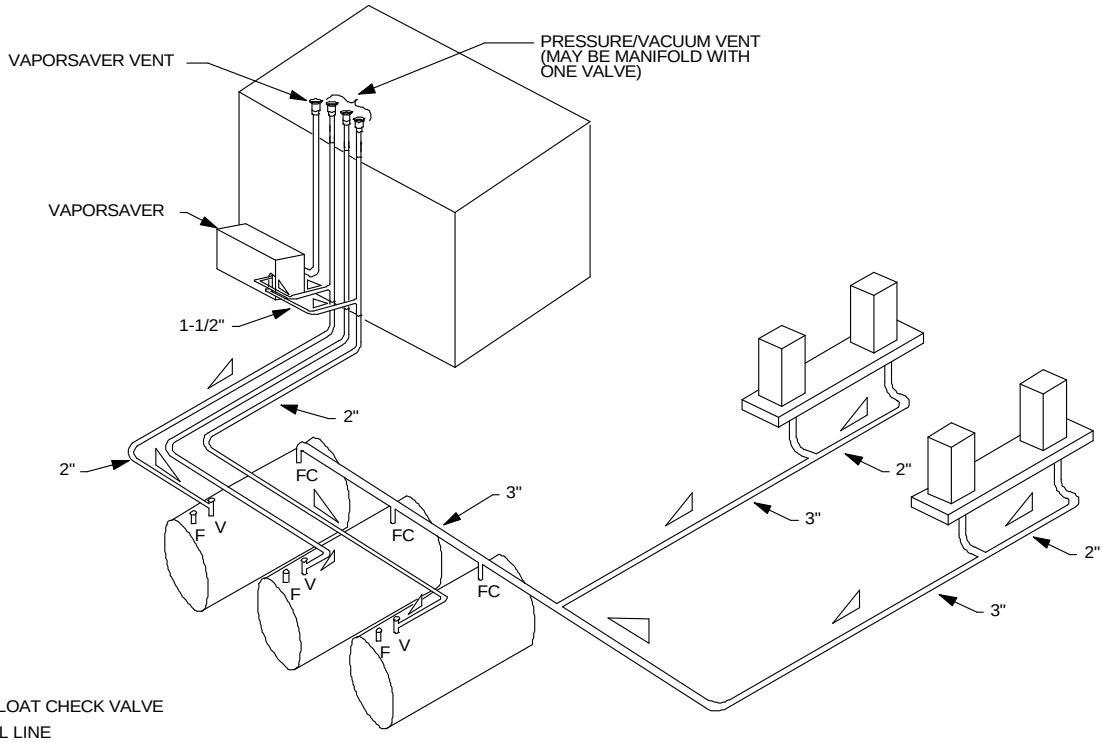
ORVR-Compatible Phase II Vapor Recovery System

Exhibit 2
Figure 2A- 6
Typical Installation of the OPW Vaporsaver
Phase II Tank Pressure Management System
with Typical Phase II Vapor Recovery System



FC = FLOAT CHECK VALVE
F = FILL LINE
V = PHASE I VAPOR RECOVERY

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Exhibit 2
Figure 2A- 7
Typical Installation of the OPW Vaporsaver
Phase II Tank Pressure Management System
with Typical Phase II Vapor Recovery System

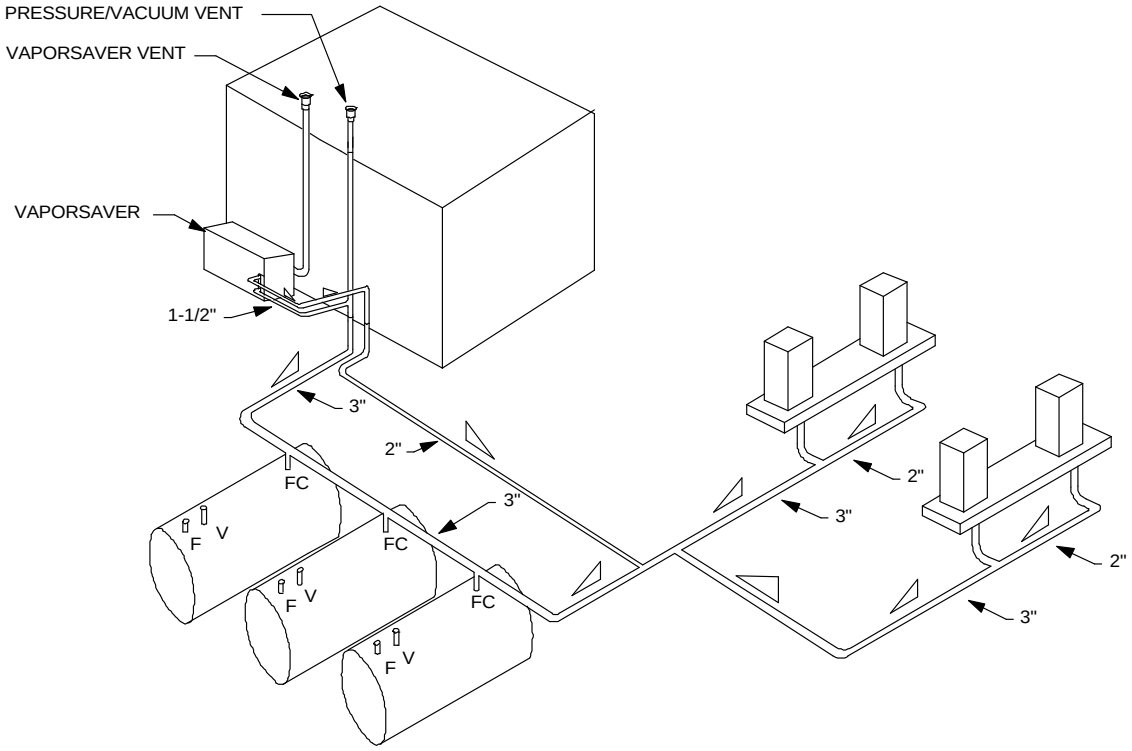

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Exhibit 2
Figure 2A- 8
Typical Installation of the OPW Vaporsaver
Phase II Tank Pressure Management System
with Typical Phase II Vapor Recovery System

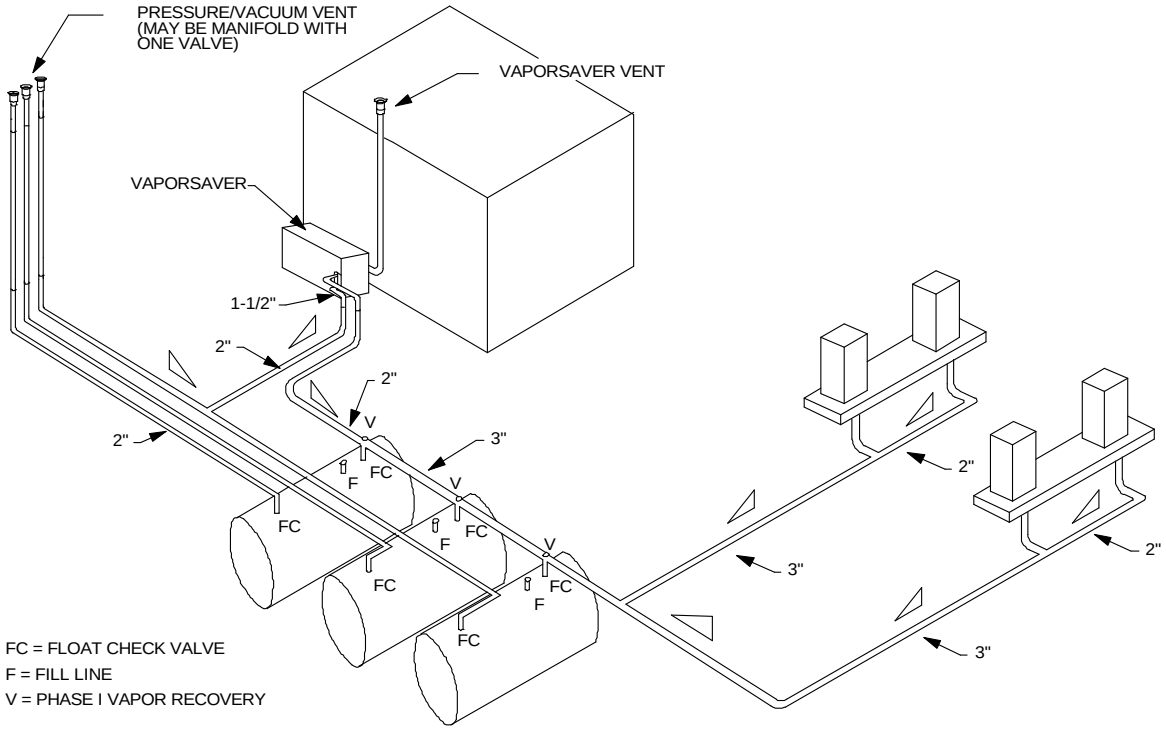

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Exhibit 2
Figure 2A- 9
Typical Installation of the OPW Vaporsaver
Phase II Tank Pressure Management System
with Typical Phase II Vapor Recovery System

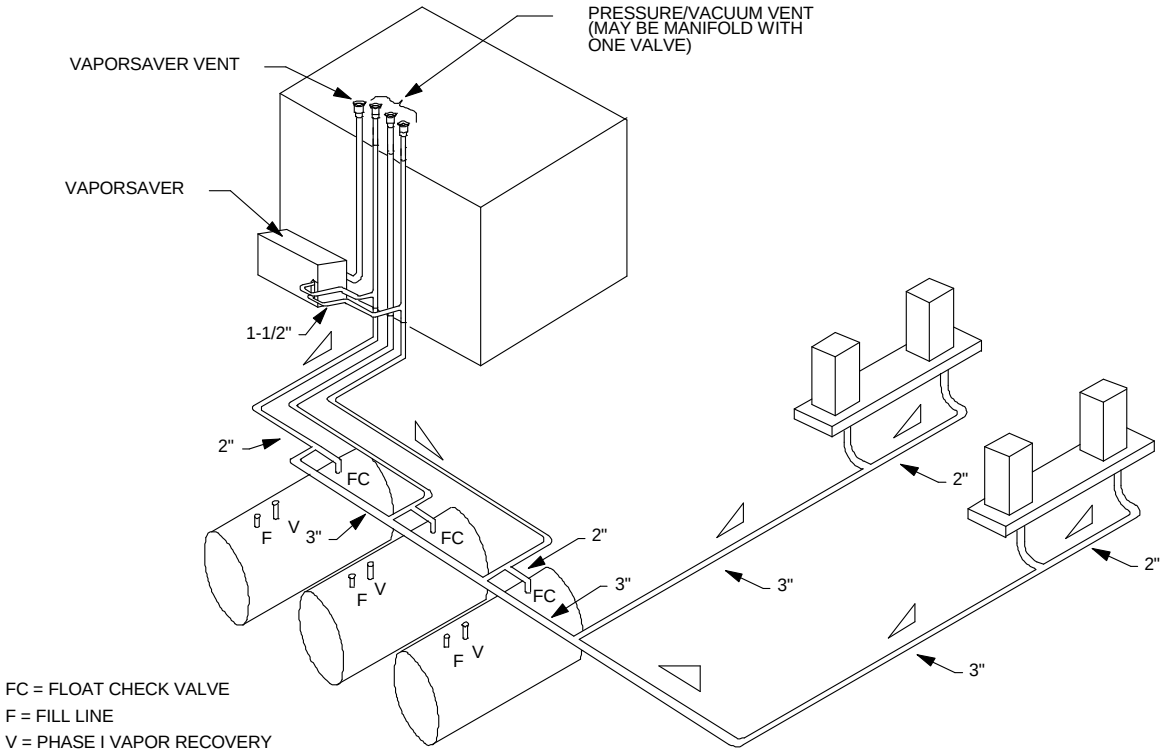

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Exhibit 2
Figure 2A- 10
Typical Installation of the OPW Vaporsaver
Phase II Tank Pressure Management System
with Typical Phase II Vapor Recovery System

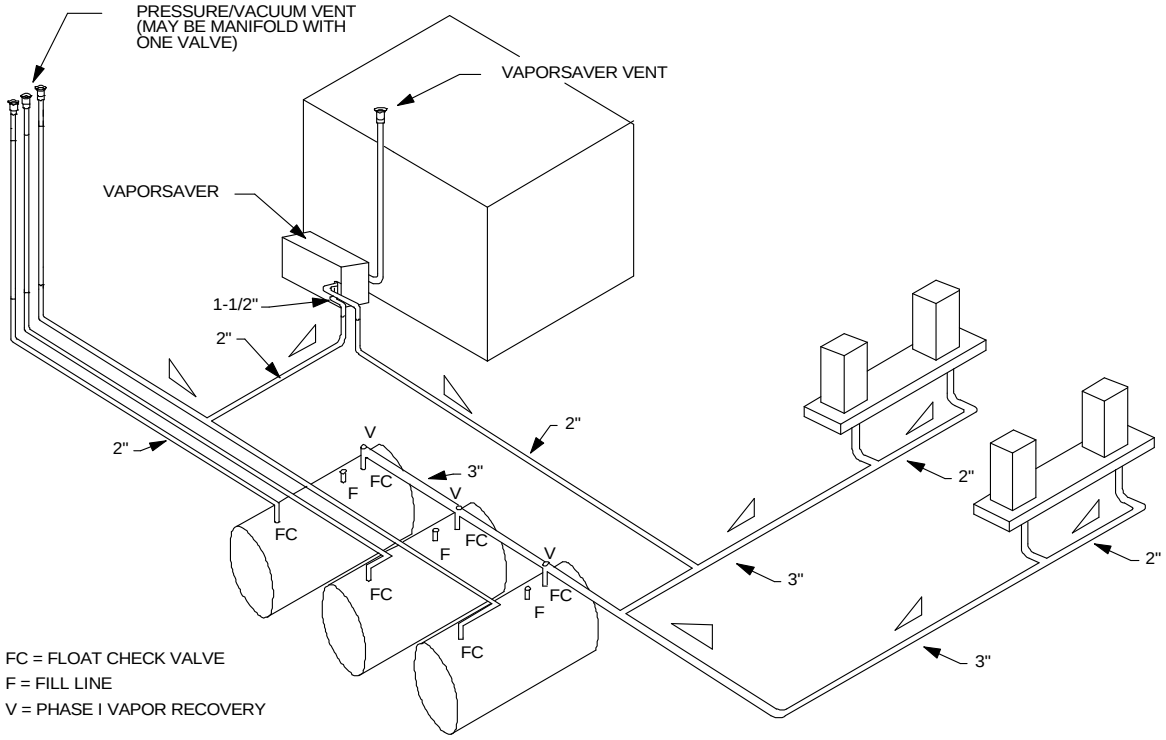

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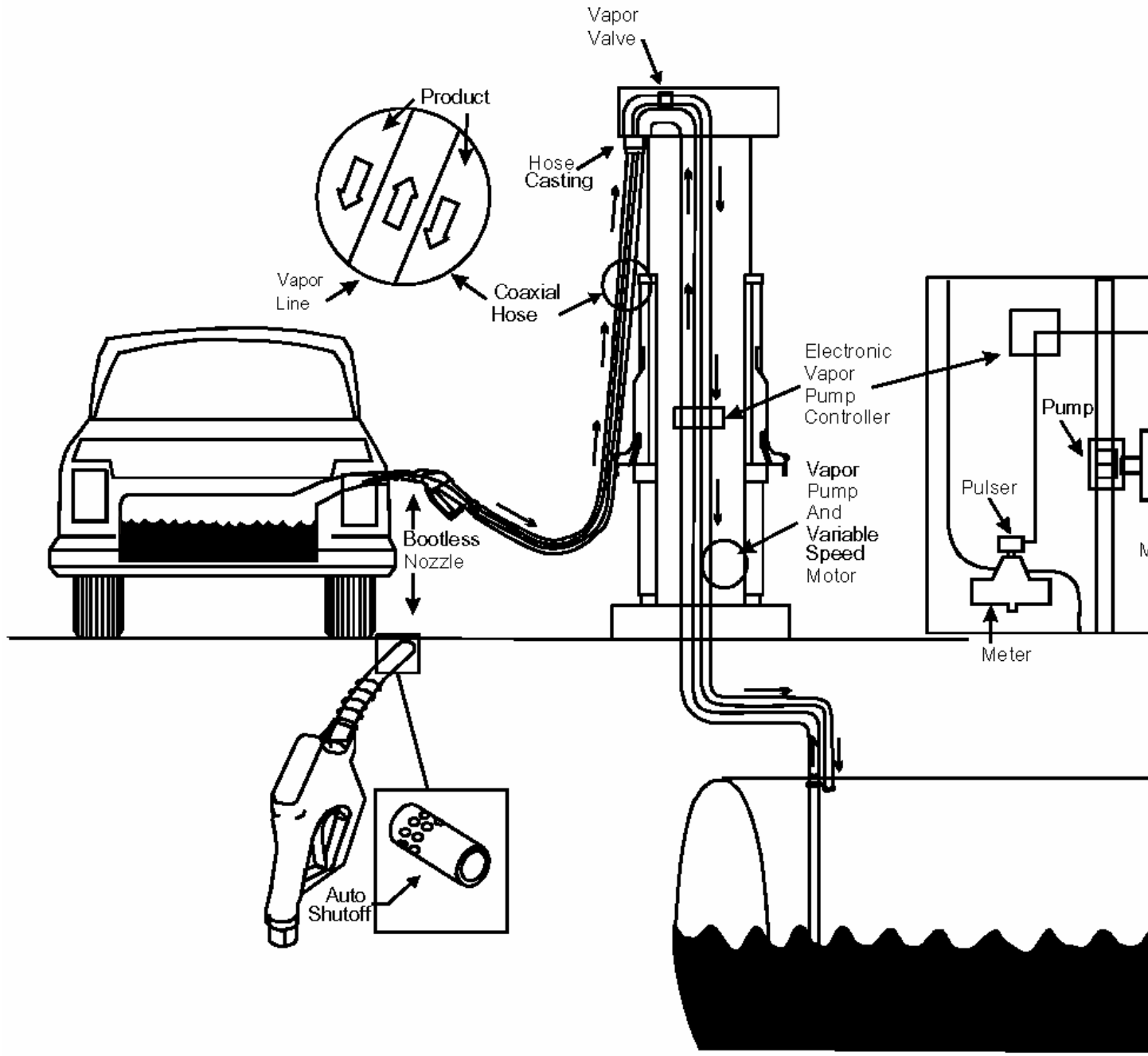
Exhibit 2
Figure 2B-1
Component Parts of the Gilbarco VaporVac System



Note: VaporVac system dispensers were originally certified with solenoid vapor valves. These vapor valves are no longer required but, if present, may remain in place.

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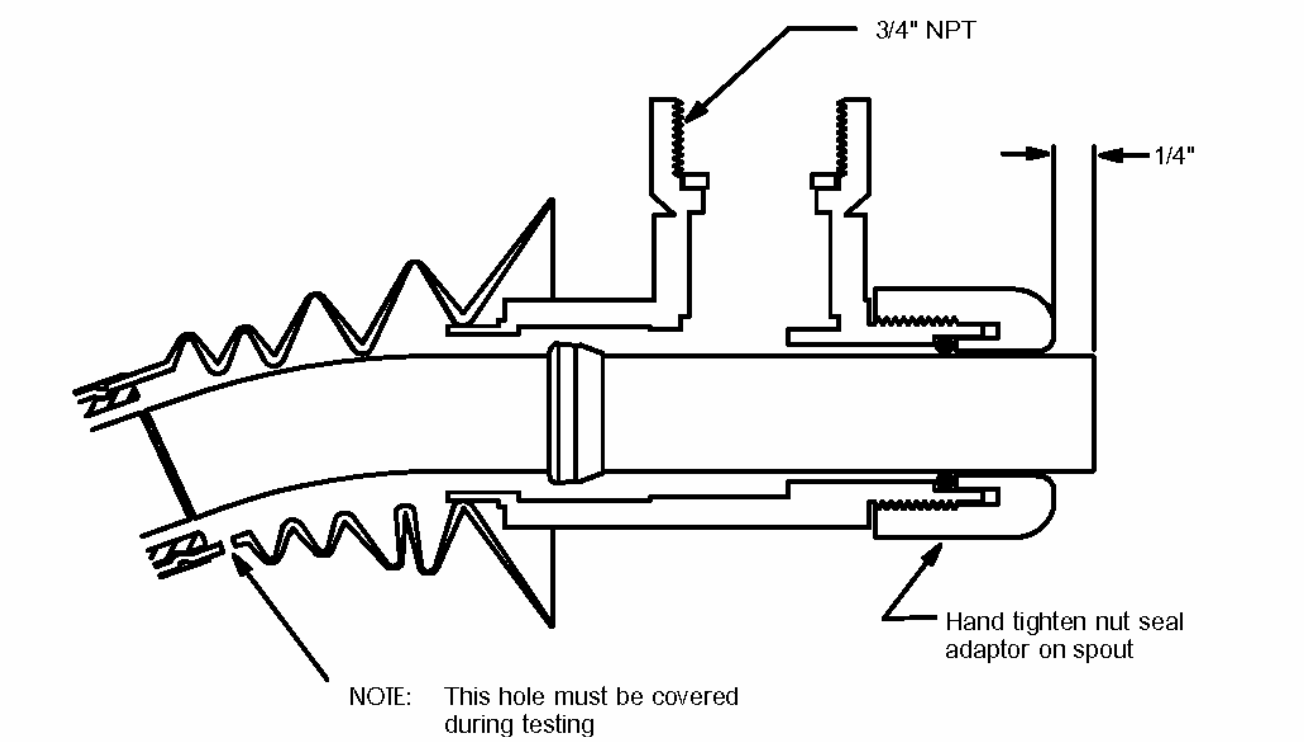
Exhibit 2
Figure 2C-1
Installation of the A/L Adaptor on Husky 6250 Nozzle



Instructions for use of the 6250 A/L Adaptor

1) Inspect the Vapor Splash Guard (VSG) and spout for damage. Any tears or extra holes in the VSG will reduce the accuracy of the test.

2) Slide the A/L adaptor over the spout such that 1/4" of the spout is exposed past the nut.

3) Hand tighten the nut. This will seal the A/L adaptor to the spout.

4) Pull the VSG up over the smallest step on the A/L adaptor. This will seal the VSG to the adaptor.

5) Using a piece of tape, seal the 1/8" hole in the cuff of the VSG.

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Exhibit 2
Figure 2D-1
Typical Installation of a Single P/V Vent Valve Manifold

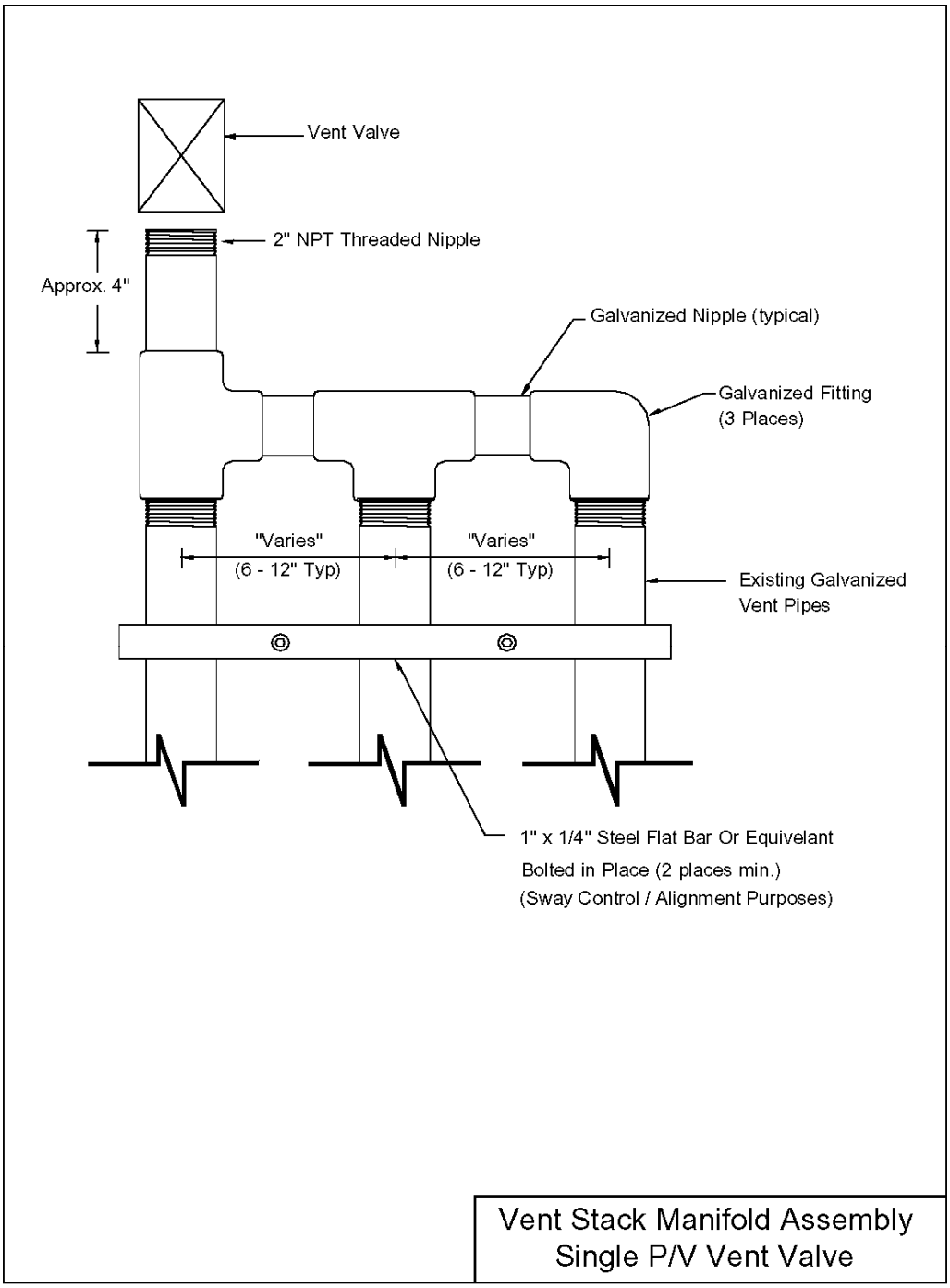

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Exhibit 2
Figure 2D-2
Typical Installation of a Two P/V Vent Valve Parallel Manifold

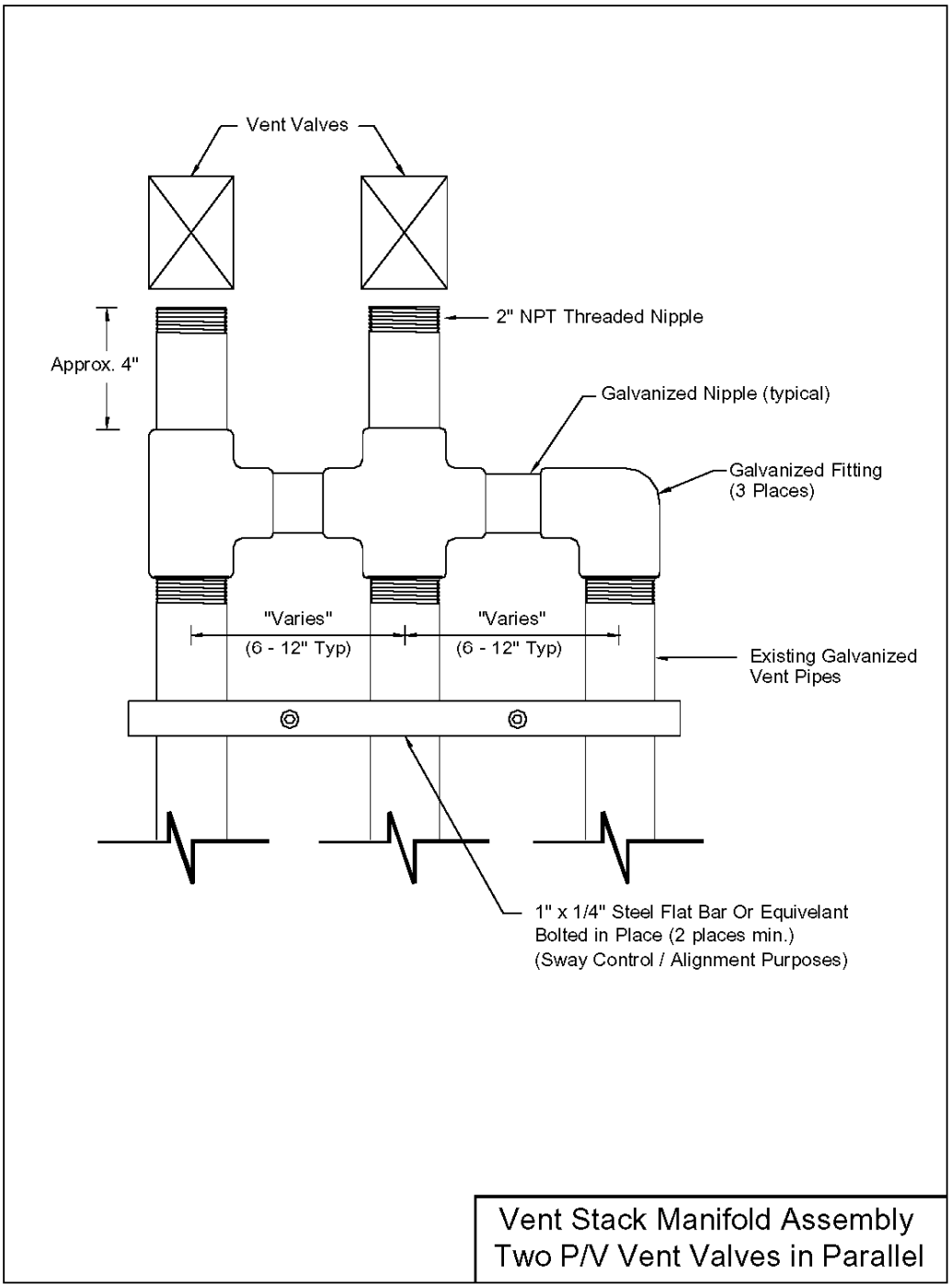

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Exhibit 2
Figure 2D-3
Typical Installation of a Three P/V Vent Valve Parallel Manifold

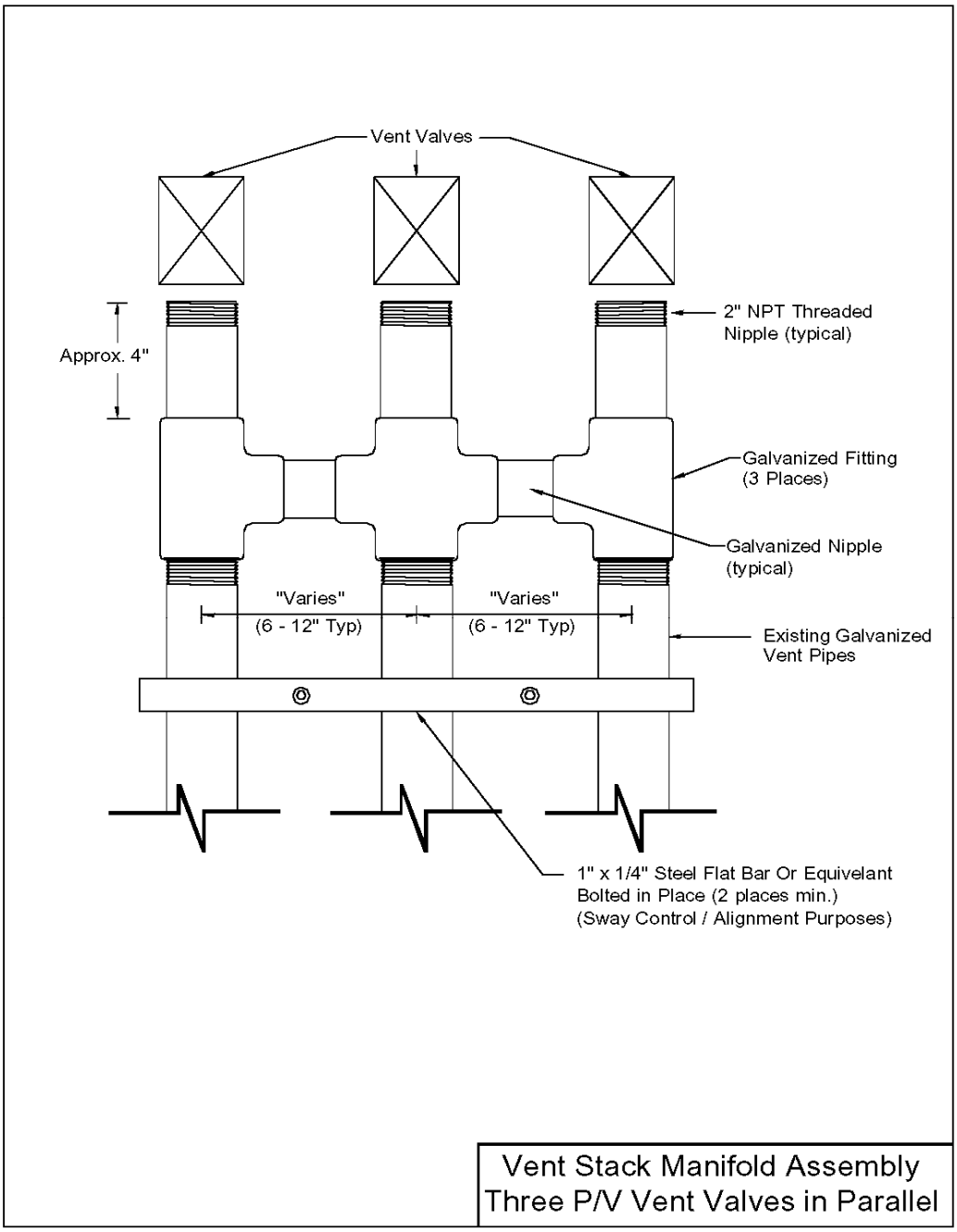

Figure 2E

Example of a GDF Maintenance Record

Date of Maintenance/ Test/Inspection/Failure (including date and time of maintenance call)	Repair Date To Correct Test Failure	Maintenance/Test/Inspection Performed and Outcome	Affiliation	Name of Individual Conducting Maintenance or Test	Telephone Number